

# IC-22A

2 METER BAND  
FM TRANSCEIVER

INSTRUCTION  
MANUAL



ICOM

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## SECTION I - SPECIFICATIONS

### GENERAL:

Frequency coverage	144.00 to 146.00 MHz or 146.00 to 148.00 MHz
Number of Transistors and Diodes	Transistors ..... 22 FET ..... 4 IC ..... 3 Diodes ..... 16
Modulation Type	F3
Power Voltage	DC 13.8V $\pm$ 15% negative ground
Current Drain	Transmit: HI (10W) average 2.1A LOW (1W) average 1.2A Receive:average 180mA
Antenna Input	50 ohms
Size	2-9/32" high x 6-1/8" wide x 8-1/2" depth.
Weight	4 lbs.

### TRANSMITTER:

RF Power Output	HI ..... 10W LOW ..... 1W
Spurious Response	-60 db
Frequency Control	Crystal (18 MHz) multiplied x 8
Maximum Frequency Deviation	Adjustable between 3 to 16 KHz
Audio Input	500 ohms
Moduration System	Variable reactance phase modulation
Microphone	500 ohms - Dynamic microphone with push button switch

### RECEIVER:

Reception Frequencies	22 channels for 2 meter band
Reception System	Double Superheterodyne
Intermediate Frequencies	1st IF: 10.7 MHz 2nd IF: 455 KHz
Sensitivity	a. Better than 0.4 $\mu$ V 20 db quieting b. S + N/N at 1 $\mu$ V input, 30 db or more
Spurious Response	-60 db, or less
Squelch	Ajustable 5 to -15 db
Band width	$\pm$ 8 KHz/ -6 db point $\pm$ 15KHz/ -50 db
Audio Output Power	1.5W
Audio Output Impedance	8 ohms
Frequency Control	Crystal (14/15 MHz) multiplied x 9

## SECTION II - DESCRIPTION

This transceiver is extremely rugged and completely solid state. State of the art devices such as Integrated Circuits, Field Effect Transistors, Varactor and Zener diodes are engineered into a tight knit straightforward electronic design throughout both transmitter, and receiver. Reliability, low current demand, compactness, unexcelled performance and ease of operation are the net result.

The dual conversion receiver with its FET front end and high-Q helicalized cavity resonators boasts low noise and sensitivity of  $0.4\mu\text{V}$  or less. Signal gain of 90 db or more is accomplished from the second mixer back by virtue of a 6 stage IF amplifier. The need for additional front end RF amplification is thus eliminated. Zener regulated crystal-controlled first and second local oscillators produce unmatched stability. Audio reproduction is of an unusually high order of distortion free clarity.

The transmitter section will produce a minimum of 10 watts RF output. Again, a Zener regulated crystal oscillator is employed for initial frequency stability. Twenty-two crystal controlled channels are provided for operating convenience and versatility. High-Q stages provide minimum interstage spurious response. A low pass filter is placed at the output to further insure undersirable frequency products are not emitted.

All circuitry is constructed on two printed circuit boards which are easily accessible for servicing. The printed circuit boards are housed in a sturdy aluminum frame which is, in turn, housed in a rigid metal case providing an extremely durable and rugged unit. Care has been taken to filter and regulate internal DC voltages. A DC input filter is provided to eliminate alternator or generator "whine" generated in the vehicle environment. Test points are brought up from all major circuits to facilitate maintenance checks and trouble shooting should the necessity arise.

Each unit comes complete with built-in speaker, a high-quality dynamic microphone, mobile mounting bracket, microphone clip, DC cabling and plug, and external speaker plug.

A modern styled face plate, large S meter, small size and low profile design complete the unit's styling. A welcome addition to any dashboard or fixed station.

## SECTION III - INSTALLATION

### 3.1 Unpacking:

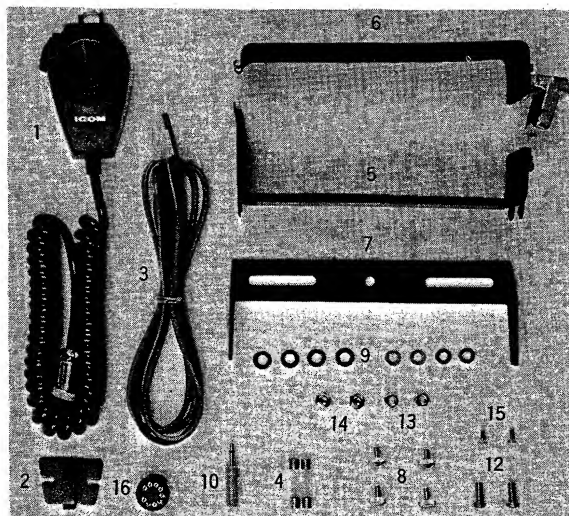
Carefully remove your transceiver from the packing carton and examine it for signs of shipping damage. Should any shipping damage be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage. It is recommended you keep the shipping cartons. In the event storage, moving, or reshipment becomes necessary, they come in handy. Accessory hardware, cables, etc., are packed with the transceiver. Make sure you have not overlooked anything.

### 3.2 Accessories:

Make sure the following accessories for the IC-22 A are included.

- |   |   |
|---|---|
| (1) Microphone (dynamic type).....      | 1 |
| (2) Microphone hook .....               | 1 |
| (3) Power cord .....                    | 1 |
| (4) Spare fuses (5A).....               | 2 |
| (5) Installing holder A.....            | 1 |
| (6) Installing holder B.....            | 1 |
| (7) Installing angle joint .....        | 1 |
| (8) Gimp nuts .....                     | 4 |
| (9) Flat washers .....                  | 6 |
| (10) Plug for speaker .....             | 1 |
| (11) Instruction manual .....           | 1 |
| (12) Mounting screws .....              | 2 |
| (13) Mounting screw's nuts.....         | 2 |
| (14) Screws for additional bracket..... | 2 |
| (15) Flat head screw's nuts .....       | 2 |
| (16) Acc. plug .....                    | 1 |

Fig. 1



### 3.3 Location:

Where you place the transceiver in your automobile is not critical and should be governed by convenience and accessibility entirely. Since the unit is so compact, many mobile possibilities present themselves. In general, the mobile mounting bracket will provide you with some guide as to placement. Any place where it can be mounted with metal screws, bolts, or pop-rivets will work. For fixed station use, the IC-3PA power supply is designed to be a stand for the transceiver.

### 3.4 Power Requirements:

The transceiver is supplied ready to operate from any regulated 13.5 VDC, 2.5 ampere negative ground source. An automobile, 12 volt, negative ground, system is usually more than adequate. Some note must be taken, however, to the condition of the vehicle's electrical system. Items such as low battery, worn generator/alternator, poor voltage regulator, etc., will impair operation of your transceiver as well as the vehicle. High noise generation or low voltage delivery can be traced to these deficiencies. If an AC power supply other than the matching IC-3PA is used with your transceiver, make certain it is adequately regulated for both voltage and current. Low voltage while under load will not produce satisfactory results from your transceiver. Receiver gain and transmitter output will be greatly impaired.

**CAUTION:** Excessive Voltage (above 15VDC) will cause damage to your transceiver. Be sure to check the source voltage before plugging in the power cord.

Included with your transceiver is a DC power cable with plug attached. The Red Wire is positive (+), the Black, negative (-). If your mobile installation permits, it is best to connect these directly to the battery terminals. This arrangement eliminates random noise and transient spikes sometimes found springing from automotive accessory wiring. If such an arrangement is not possible, then any convenient B+ lead in the interior of the vehicle and the negative frame can be utilized. Your transceiver provides an internal DC filter that will take out the large amount of transient difficulties anyway. Remember,

the unit operates on a negative ground system only - it cannot be used in a positive ground automobile. After making your connections, simply insert the plug into your transceiver.

When your transceiver is mated with its matching AC power supply, the IC-3PA the power cable from the IC-3PA is simply plugged in the same receptacle in the transceiver and the AC line cord into any convenient wall receptacle.

### 3. 5 Antenna:

The most important single item that will influence the performance of any communication system is the antenna. For that reason, a good, high-quality, gain antenna of 50 ohms impedance is recommended, fixed or mobile. In VHF as well as the low bands, every watt of ERP, makes some difference. Therefore, 10 watts average output plus 3 db of gain antenna equals 20 watts ERP, presuming low VSWR of course. The few more dollars investment in gain type antenna is well worth it.

When adjusting your antenna, whether mobile or fixed, by all means follow the manufacturer's instructions. There are some pitfalls to be aware of. For example, do not attempt to adjust an antenna for lowest VSWR when using a diode VSWR meter not engineered for VHF applications. Such readings will invariably have error of 40% or more. Rather, use an in line watt meter similar to the Drake WV-4, Bird Model 43 or Sierra Model 164B with VHF cartridge. Further, when adjusting a mobile antenna, do so with the motor running preferably above normal idling speed. This will insure proper voltage level to the transceiver.

The RF coaxial connector on the rear chassis mates with a standard PL-259 connector. Some models may have a metric thread. In any event, the RF connector will mate with almost any PL-259 connector if care is taken to seat them properly.

### 3. 6 Microphone:

A high quality dynamic microphone is supplied with your transceiver. Merely plug it into the proper receptacle on the front panel.

This microphone is of 500 ohms impedance with a normal output of 6mV. Should you wish to use a different microphone, make certain it is of equal impedance and output level. Under no circumstances use a "gain pre-amp" or ceramic type microphone. The audio system in your transceiver is more than adequate and additional pre-amplification is unnecessary. To use this class of microphone is to invite distortion and possible damage to the transceiver.

### 3. 7 Crystals:

Your transceiver has 22 channels, both transmit and receive, or a total of 44 crystal sockets. The channel selector switch selects one transmit and one receive channel in each of its 22 positions.

To order additional crystals from a manufacturer, the following correlation data is provided. Remember to specify high activity as prerequisite to your acceptance.

#### Crystal Data

Holder Type:	HC-25/u
Calibration Tolerance:	0.0025%
Load Capacitance:	20 pF
Effective Resistance:	15 ohms or less

Cut: "AT" optimum angle  $\pm 2$  min.

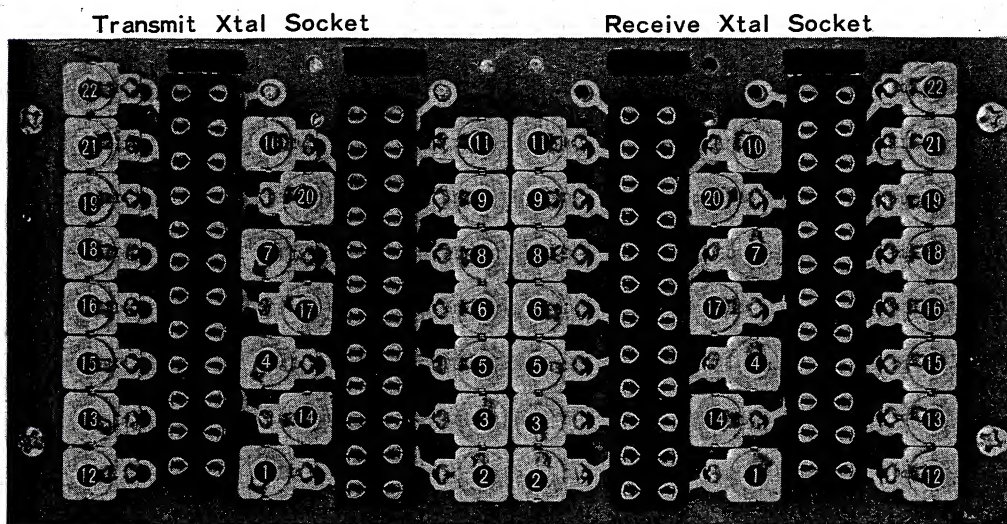
Transmit Crystal:  $\text{Crystal Frequency} = \frac{\text{Desired Operating Frequency}}{8}$

Receive Crystal:  $\text{Crystal Frequency} = \frac{\text{Desired Operating Frequency} - 10.7 \text{ MHz}}{9}$

Trimmers have been placed on the crystal board to assist you in "tweaking" new crystals on frequency. Consult the trimmer location chart (Fig. 2) for their positions.

The amount of frequency spread between any two receiving or any two transmitting frequencies should not exceed 2 MHz. Since the receiver and transmitter are independent of each other, you may have any practical amount of frequency separation you wish here. Only two or more widely spaced frequencies for the receiver alone or for the transmitter alone need be considered under the 2 MHz limitation.

CRYSTAL POSITION CHART Fig. 2



### 3.8 External Speaker:

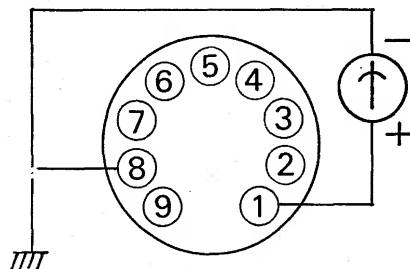
An external speaker jack and plug is supplied with your unit in the event another speaker is desirable. The external speaker impedance should be 8 ohms. The use of the external speaker jack will disable the internal speaker. An 8 ohm headset can be utilized as well. (See Fig. 5)

### 3.9 Accessory Socket :

1. Discriminator output
8. Ground.

The discriminator output from Pin 1 is used for an indication of the frequency difference between an incoming signal and the receive frequency. A 50 uA center meter is connected to Pin 1 and Pin 8. The other 7 pins may be used for whatever you wish. Some examples might be power supply voltage, audio output, frequency check, remote control, etc.

Fig. 3



## SECTION IV - CONTROL FUNCTIONS

### 4.1 Front Control and Jacks (Fig. 4)

**High-Off-Low Switch:** opens or closes the 12 VDC source voltage to the transceiver. "In high" position, output power is 10 watts. "In low" position, output power is 1 watt.

**Volume Control:** controls audio output level of the receiver.

**Squelch Control:** controls the squelch threshold point of the receiver.

**Microphone Jack:** accepts 3 prong mike plug supplied on microphone.

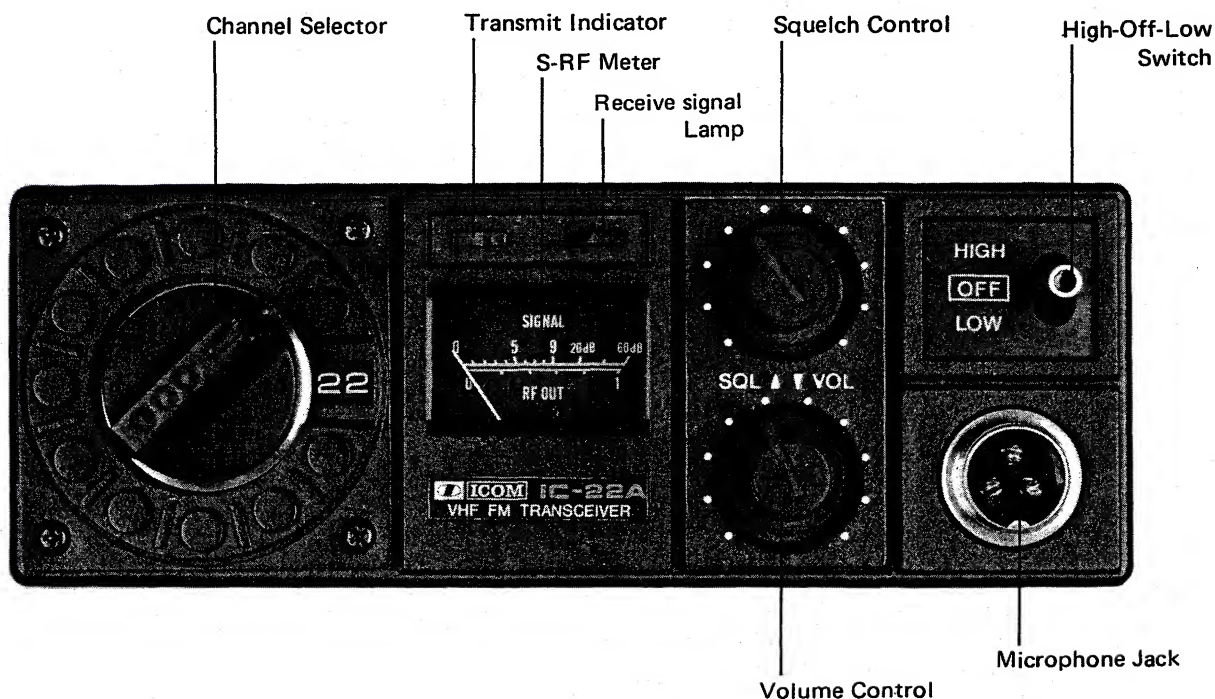
**S-RF Meter:** reads S signal strength in receive mode and relative RF output in transmit mode. The meter face is illuminated with a white lamp when the transceiver is switched on.

**Channel selector:** selects one of 22 pairs of transmit-receive crystals.

**Receive signal lamp:** Illuminates with an incoming signal.

**Transmit Indicator:** Illuminates during transmit

Fig. 4



#### 4. 2. Rear Panel (Fig. 5)

**RF Output Jack:** Accepts standard PL-259 coaxial connector. Note: Some transceivers may come with a metric threaded connector. Most PL-259 connectors will mate satisfactorily if care is taken to seat them properly. If you have difficulty, try a different make of PL-259.

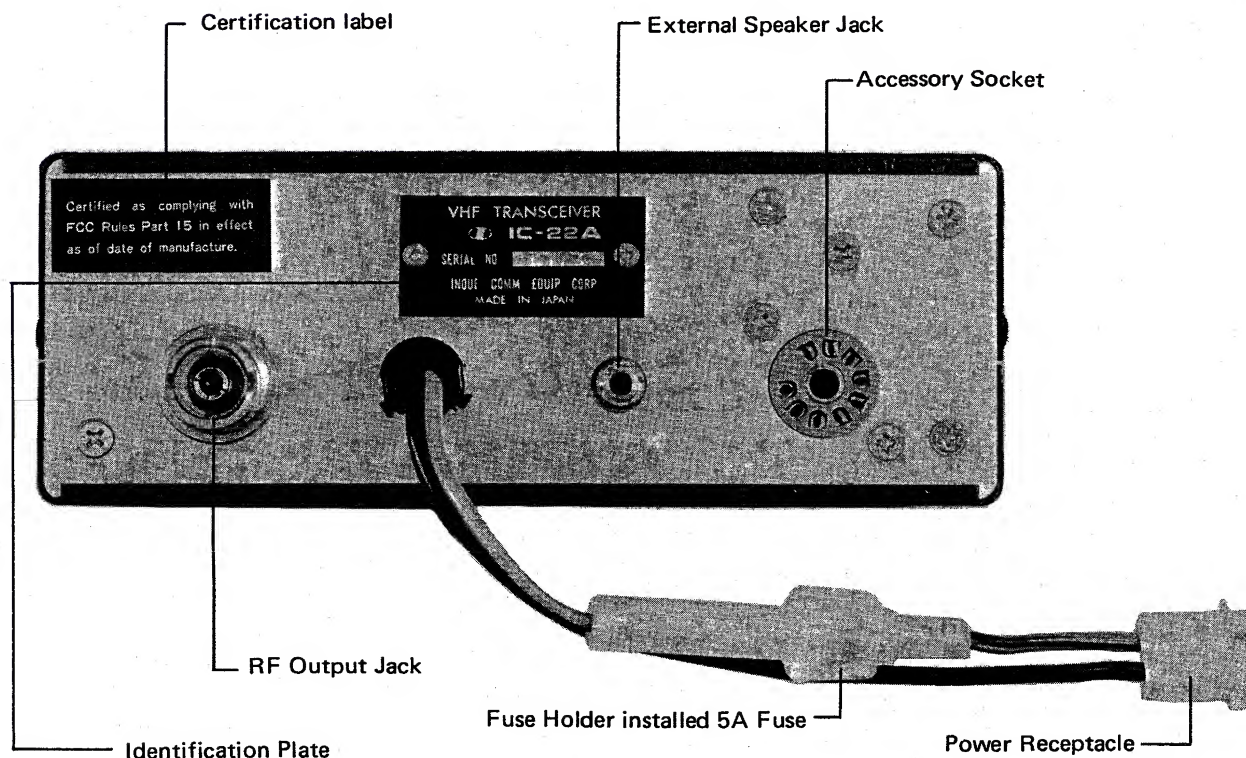
**External Speaker Jack:** This jack mates with the plug supplied for external 8 ohm speaker or headset use. The use of this jack mutes the internal speaker.

**Power Cord:** Mates with DC cord plug or power cord of IC-3PA AC power supply.

**Identification Plate:** States model and serial number.

**Accessory Socket:** Center Meter etc, can be connected with.

Fig. 5



## SECTION V - OPERATION

### 5.1 Initial Preparations:

- a. Connect the microphone to the microphone jack.
- b. Connect the antenna to the antenna coax connector. Make sure the coax line is of the correct impedance (50 ohms) and is neither shorted nor open.
- c. Make sure the function switch is in the off position, then connect the power supply cord to the power supply jack. The red lead should be connected to the positive side of the power source and the black lead to the negative side. In the event that these leads are improperly connected the IC-22 A will not function. No damage will occur, however, since protection is provided in the IC-22 A for this purpose.
- d. Turn the volume and squelch controls to the maximum counter clockwise position.

### 5.2 Operation:

- a. When the function switch is set to either the high or low position the set is switched on and the channel indicator window and meter will be illuminated.
- b. Switch the channel selector to the desired channel.

### 5.3 Reception:

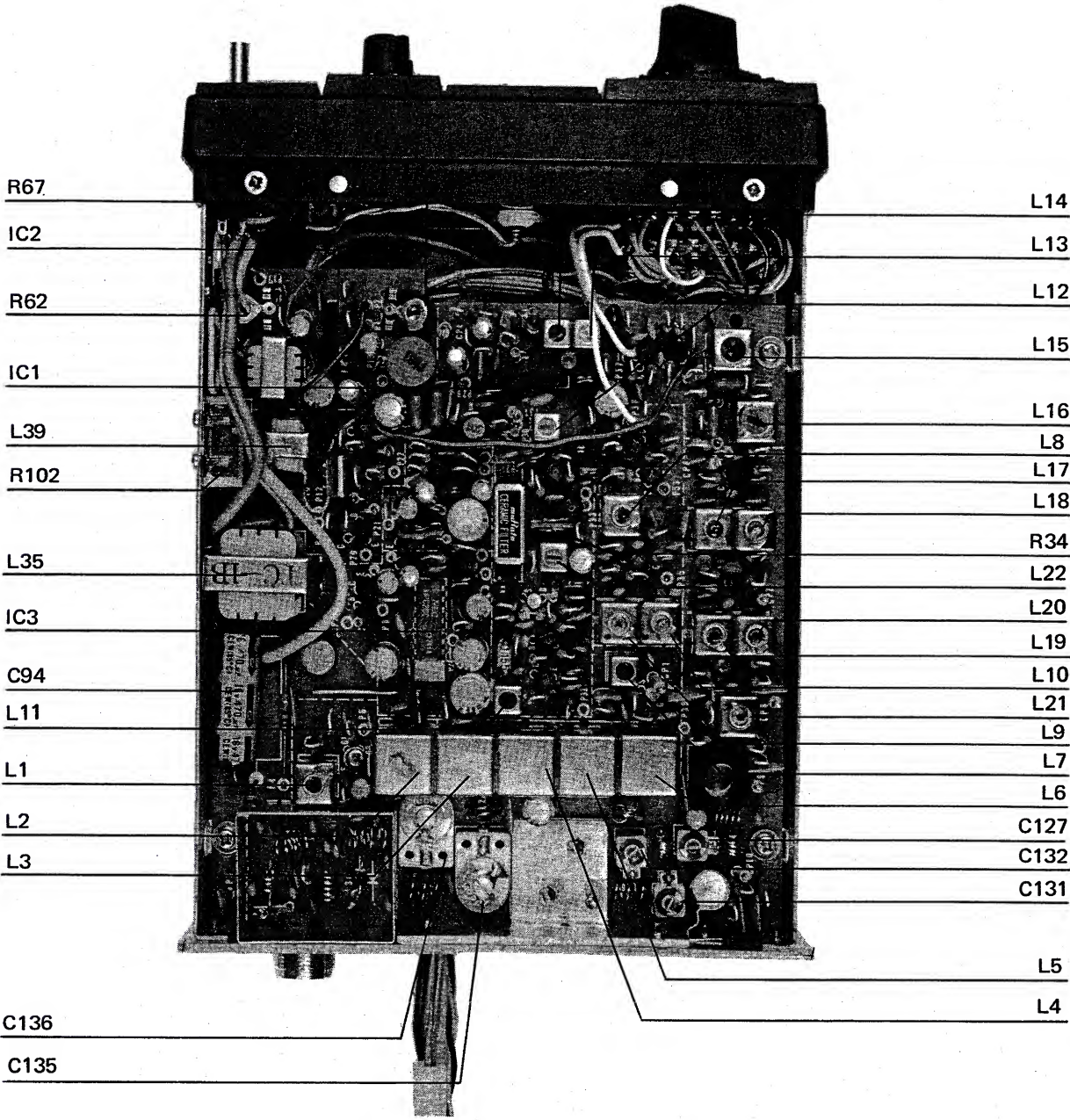
- a. Adjust the volume control to a comfortable listening level of noise, if no signal is present.
- b. Carefully adjust the squelch control clockwise until the noise just disappears. This is the proper squelch threshold setting and must be done when no signal is present. Your transceiver will now remain silent until an in-coming signal is received which opens the squelch. If the squelch is unstable due to the reception of weak or unstable stations, adjust the squelch control further until the proper threshold is obtained.
- c. The S meter indicates the signal strength of the in-coming stations and is calibrated in S units, and db over S9.

### 5.4 Transmitting:

- a. Push the PTT (push to talk) button on the microphone and the transceiver will transmit. At the same time the TX indicator will be illuminated red and the meter will provide an indication of relative power output of the transmitter. The pointer will be on or near the red mark on the meter scale when on high power and just a little over one on low power.
- b. Hold the microphone about three inches from your mouth and speak in a normal voice. The microphone is of the dynamic type and provides good pickup for all levels of voice.
- c. To receive again, just release the PTT button. This will also switch off the red TX light.

TOP VIEW

Fig. 6



## SECTION VI - THEORY OF OPERATION

### 6.1 Receiver RF Amplifier and First Mixer

The input signal is amplified by the field effect transistor Q4 (3SK48) and passed into the RF filter. This filter is a high Q helicalized resonator with excellent bandpass characteristics and shockproof construction. From the output of the helicalized resonators the signal is fed to the gate of the first mixer. Q5 (3SK37) where it is mixed with the output from the receiver crystal oscillator unit (Q3), which is fed into the source of Q5 to obtain the 10.7 MHz IF signal. The output of the mixer is fed through the first ceramic filter FL 1 (SFC 10.7 MA) to the IF amplifier. All transistors in the receiver RF unit are field effect transistors, which have the highest possible sensitivity and signal to noise ratio and the lowest possible cross modulation.

### 6.2 Receiver crystal Oscillator

This is a fundamental oscillator circuit at 14/15 MHz using Q1 (2SC372). The trimmers in series with the crystals make it possible to alter the crystal frequency several KHz. The output is taken from the emitter and tripled by Q2 (2SC372) and again tripled by Q3 (2SC784). The outputs signal is then fed into the First Mixer, Q5 (3SK37) giving the first IF of 10.7 MHz.

### 6.3 Receiver 1st IF amplifier, 2nd Mixer, 2nd IF amplifier, Limited and Discriminator

The 10.7 MHz signal from the first ceramic filter in the RF unit is amplified by Q6 (2SK19) and fed to the gate of the 2nd Mixer Q8 (2SK37) through transformer LS-7. The 2nd Oscillator Q7 (2SC372) is crystal controlled and operates on 10.245/11.155 MHz. The output is taken from the emitter of Q7 and fed into the gate of the 2nd Mixer Q8 (2SK37) to obtain the 455 KHz IF signal, which is passed through the 2nd ceramic filter FL 2 (CFM 455 E) and amplified by Q9, Q10 and IC 1. The output of IC 1 is then demodulated in the discriminator circuit, consisting of L13, L14 and D2 and D3 (1N60s).

### 6.4 Receiver Audio Amplifier, Squelch and Speech Amplifier

The output of the discriminator drives two circuits: the audio amplifier, and the squelch. The audio signal, after being adjusted by the volume control R-1, is then fed to IC 3 ( $\mu$ PC 575C2).

The squelch circuit is made up of Q11, Q12 (2SC373s), Diodes D5, D4 (1N60s), and Q13 (2SC372). In the absence of a signal, the noise component at the output of the discriminator is amplified, Diodes D5 and D4 rectify this amplified component and couple it via the 10K ohm R-2 squelch control to the DC amplifier, Q13 output is coupled directly to the base circuit of IC 3. When the squelch control is adjusted, the amount of DC required to cut off IC 3 is found, thus establishing the squelch threshold. When a signal is incoming via the discriminator, this bias is overcome, permitting the audio amplifier and driver to perform normally.

The signal from the microphone is amplified by IC2, before being fed to the modulation circuit in the transmitter oscillator. This IC is both an amplifier and clipper.

### 6.5 Power Supply Circuit

This circuit provides a source of regulated voltage for the receiver circuits and the control of output power during antenna mismatch conditions, as described above. The receiver voltage is regulated to about 9 volts by the series pass transistor Q24 (2SC619) which has it's base set at 10 volts by the zener diode D13 (MZ210).

#### 6.6 Transmitter Crystal Oscillator and Phase Modulator

Transistor Q14 (2SC373) operates as a fundamental oscillator at a frequency of 18 MHz. The output of this oscillator, taken from its emitter, is fed to the base of transistor Q15 (2SC373) which operates as a buffer amplifier between the oscillator and phase modulator circuit. Trimmer capacitors are provided in series with each crystal which allows the frequency of the oscillator to be varied by several KHz. Thus the final output of the transmitter can be set precisely on the desired frequency.

The Phase modulator circuit consists of Varactor diode D-8 (1S 2688), L-16 (LS-10), and various resistors. Resistors provide a bias voltage for the reverse biasing of the Varactor diode D8. An audio voltage is coupled into this same bias point through the 1 mH inductor. This audio voltage is derived from the speech amplifier circuit.

#### 6.7 Transmitter Multiplier and Pre-driver

The modulated signal from diode D8 is multiplied eight times to a final frequency of 146 MHz by transistors Q16, Q17 (2SC763s), and Q18 (2SC773). Each of these transistors act as frequency doublers. Double tuned circuits are used between stages to minimize spurious radiation and to achieve an even response over the 146 to 148 MHz range.

The 146 MHz signal is amplified by Q19 (2SC741) and Q20 (2SC730).

#### 6.8 Transmitter Power Amplifier

The signal from the multiplier and pre-driver unit is amplified to 10 watts by transistor Q21 (2SC1528). Transistor Q21 is the power output stage and is coupled to the antenna through the electronic TR switch and the harmonic filter. Resistor R102 is connected to the collectors of Q20, Q21 to reduce the output power.

## SECTION VII - MAINTENANCE

7.0 The necessity of completely realigning the unit is unlikely. The most common cause of breakdown is component failure. Great care and precision are employed in its manufacture, and warranty service is provided to ensure that it meets specifications. Adjustments not outlined herein should not be undertaken unless the owner is skilled as a technician.

#### 7.1 Transmitter and Receiver frequency alignment and netting without instruments.

Connect the zero center 50 micro-amp meter to the number 1 and 8 pins of the Acc. Socket. While receiving stations on the desired channel known to be on frequency, adjust receive crystal trimmer capacitor for zero indication on the meter. Disconnect antenna from transceiver. Remove one end of the green lead connected to P-19 and connect to P-53. While observing the zero center meter adjust transmit trimmer capacitor for zero indication.

#### 7.2 Transmitter Alignment:

- Remove the two retaining screws on the top and bottom of the cabinet and the six self tapping screws at the rear of the cabinet. Separate the Chassis from the cabinet.
- Connect a dummy load (50 ohms) or a wattmeter to a coax connector. (Fig. 5).
- Connect the power supply cord to the power jack (Fig. 5) and the microphone to the microphone jack. (Fig. 4)

- d. To align the transmitter on a desired frequency switch the channel control to the desired channel. Slowly adjust the trimmer capacitor for that channel until the desired frequency is achieved. Consult Fig. 2 for the location of the proper trimmer. These trimmers should be adjusted very slowly while the transmit frequency is observed on suitable measuring equipment. Another IC-22A equipped with a discriminator meter can serve well for this purpose.

This adaptation can be accomplished by installing a 50 microampere center 0 meter. Install the meter at the accessory socket, and ground. With the meter installed, in the receive mode on the channel desired, adjust the trimmer capacitor for the null point on the meter.

- e. The Multipliers, driver and Power output stages should be aligned on LOW power first then set the function switch on HIGH power. Align these stages according to the alignment chart provided. (See Chart 1).

Be careful not to transmit for more than 5 Seconds during each alignment step. As damage could be caused to the transistors due to overloading during this procedure.

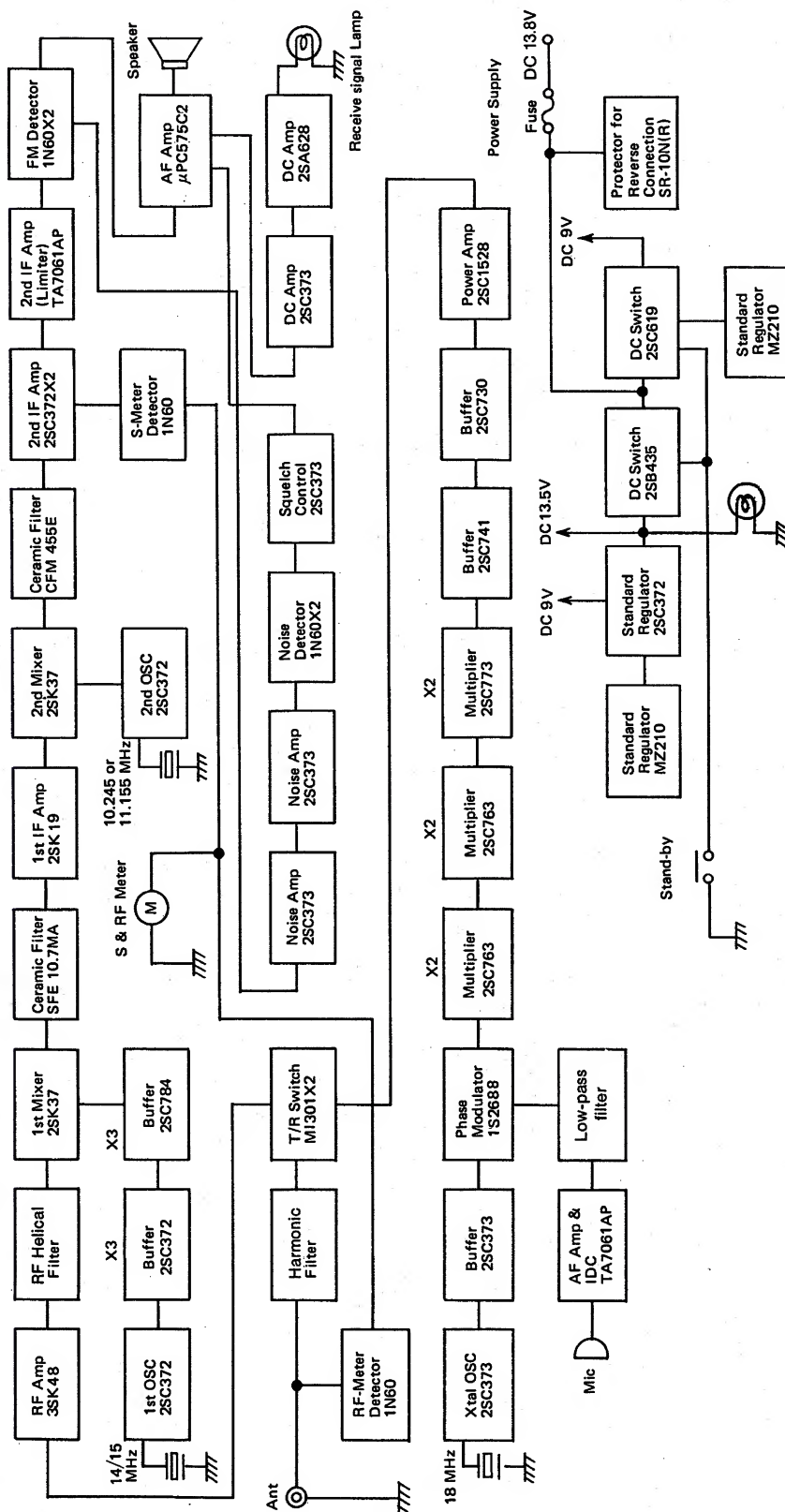
### 7.3 Receiver Alignment:

- a. Remove the microphone from the transceiver to prevent accidental transmission during receiver alignment.
- b. Allow the test oscillator or generator to stabilize.
- c. Connect the test oscillator or generator to the antenna coax connector. Set the test oscillator or generator to the desired frequency. Set the squelch control to the maximum counter clockwise position.
- d. Align the receiver according to the chart provided. (See Chart 1).
- e. When setting the receiver to a desired frequency a discriminator meter should be connected to Acc. pins 1 & 8 and the receiver trimmer Capacitor adjusted to cause the S meter to read a maximum and the discriminator meter to read zero. Refer to Fig. 2 for the location of the proper trimmer corresponding to the channel to be used. Adjust these trimmers very slowly while observing the discriminator meter.

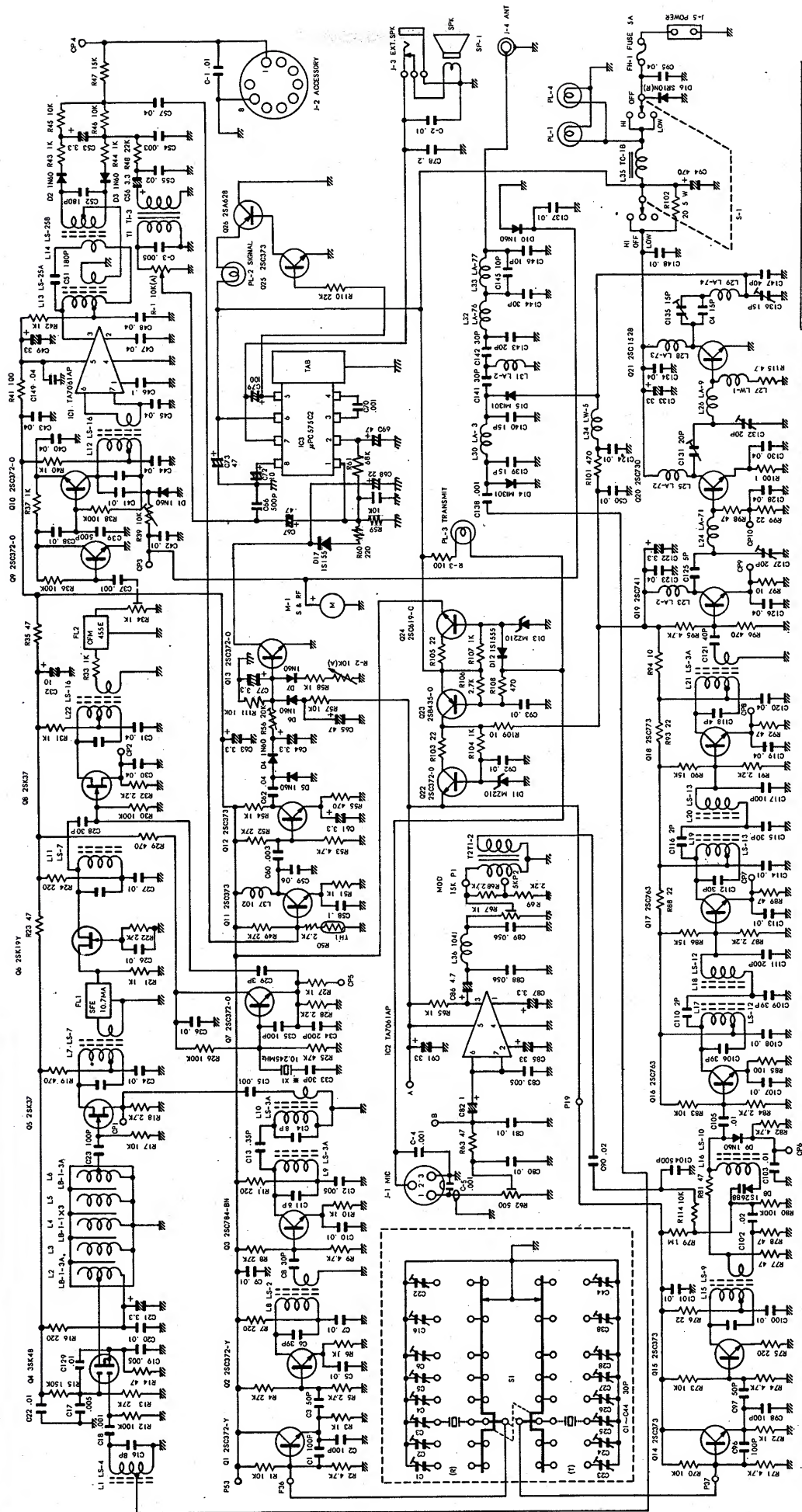
This equipment has been carefully aligned with very expensive and accurate equipment, including a Spectrum Analyzer to reduce Spurious Radiation.

Do not adjust, replace parts, or perform any type of maintenance unless you are fully qualified to do so.

## SECTION VIII — BLOCK DIAGRAM



# SECTION IX — SCHEMATIC DIAGRAM



11.155 MHz instead of 10.245 MHz, is employed in the 146-148 MHz version.

Some components subject to change  
for improvement without notice.

# SECTION X — PRINTED WIRING BOARD

COMPONENT SIDE OF BOARD Fig. 7



## SECTION XI – VOLTAGE CHART (Chart 1) 1)

DEVICE	NUMBER	BASE	EMITTER	COLLECTOR	REMARKS		HEP
Q1	2SC372	1.9	1.6	5.3	OSC		55
Q2	2SC372	0.5	0.5	6.0	TRIPLER		55
Q3	2SC784	0.7	0.7	5.9	TRIPLER		56
Q4	3SK48	0(G1)	0.3 (G2)	0.2 (S)	RF AMP		F2004
		7.4 (D)					
Q5	2SK37	0(G)	1.3 (S)	8.1 (D)	1ST MIXER		F0021
Q6	2SK19	3.2	2.5	8.0	10.7 AMP		50
Q7	2SC372	1.8	20	7.3	2ND L.O.		50
Q8	3SK37	0 (G)	1.3 (S)	8.0 (D)	2ND MIXER		F0021
Q9	2SC372	0.7	0	2.4	455 AMP		50
Q10	2SC372	5.8	5.2	6.1	455 AMP		50
Q11	2SC373	1.2	0.6	8.0	NOISE AMP		55
Q12	2SC373	1.2	0.6	7.0	NOISE AMP		55
Q13	2SC372	0.7	0	5.0/0	SQL OFF/ON		50
Q14*	2SC373	1.0	0.5	6.0	TX OSC		50
Q15*	2SC373	1.0	0.4	5.6	BUFFER		50
Q16*	2SC763	1.0	0.5	4.4	DOUBLER		50
Q17*	2SC763	1.2	0.8	13.0	DOUBLER		50
Q18*	2SC773	0.8	0.8	13.0	DOUBLER		736
Q19	2SC741		1.2	13.0	PREDRIVER		75
Q20	2SC730		0	13.5	DRIVER		S3001
Q21	2SC1528		0	13.5	FINAL AMP		3006S
Q22*	2SC372	10.4	9.7	13.0	V. REG-TX OSC		50
Q23	2SB435	13.0	13.0	0	SOLID STATE REALAY		S3027
Q23*	2SB435	13.0	13.0	12.7			
Q24	2SC619	10.3	9.6	13.0	V. REG-RX		53
Q25	2SC373	0.6	0	0	SQL DRV	UNSQL	50
Q25	2SC373	13.0	0	13.0		SQL	50
Q26	2SA628	12.7	13.6	13.0	SQL LAMP SWITCH	ON	52
Q26	2SA628	0	13.6	0		OFF	

### INTEGRATED CIRCUITS

DEVICE	NUMBER	PIN NUMBER							
		1	2	3	4	5	6	7	8
IC1	TA7061AP	1.9	1.9	6.1	0	8.4	1.9	1.9	
IC2	TA7061AP	1.9	1.9	6.1	0	8.4	1.9	1.9	
IC3	μPC575C2	1.4	13	12.3	7.3	6.1	13	0.2	1.7

### TEST AND CHECK POINTS

CP NUMBER	VALUE	REMARKS
CP1	1.1	TUNE FOR MAXIMUM DC, WITH RF PROBE
CP2	1.3	TUNE FOR MAXIMUM DC
CP3	0.6	VALUE AT 5μV RF INPUT
CP4	0	DISCRIMINATOR TEST POINT, 0.1-0.8VAC AUDIO 5KHz
CP6*	0.3VDC	BUFFER MODULATOR, TUNE FOR MAX WITH RF PROBE
CP7*	0.8	TUNE FOR MAXIMUM
CP8*	1.3	TUNE FOR MAXIMUM
CP9*	1.2	TUNE FOR MAXIMUM
CP10*	-0.1	TUNE FOR MOST NEGATIVE VOLTAGE

### NOTES:

\* VALUES MARKED IN SUCH MANNER ARE VALID DURING TRANSMIT ONLY.

INOUE COMMUNICATION EQUIPMENT CORPORATION  
1-6-19, KAMIKURATSUKURI HIRANO-KU,  
OSAKA JAPAN